

REMARKS

Status of Claims

Claims 1, 2, 6, and 11 are pending, with claims 1 and 11 being independent. Claims 1, 2, 6, and 11 have been amended to correct a typographical error in spelling. Claims 1 and 2 have been amended to more clearly recite and distinctly claim the present invention. Support for the amended claims may be found throughout the specification including the original claims. Therefore, no new matter has been added.

Applicants respectfully request the Examiner to reconsider and withdraw the outstanding rejections in view of the foregoing amendments and the following remarks.

Claim Rejections under 35 U.S.C. § 112, second paragraph

Claims 1, 2, 6, and 11 are rejected under 35 U.S.C. § 112, second paragraph as being indefinite. In response, claims 1, 2, 6, and 11 have been amended to correct a typographical error in the spelling of the dye name. As such, the claims have been amended to recite a "pyridone azo compound." Accordingly, Applicants respectfully submit that the rejection has been obviated and respectfully request withdrawal of the rejection.

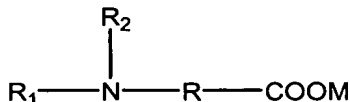
Claim Rejections under 35 U.S.C. § 103

Claims 1 and 2 are rejected under 35 U.S.C. § 103(a) as being unpatentable over Tsutsumi (U.S. Patent No. 6,031,019) or Komatsu (U.S. Patent No. 6,379,443) either of which in view of Ohyama (U.S. Patent No. 5,359,075). Applicants respectfully disagree with this rejection; therefore, the rejection is traversed.

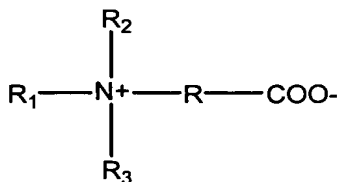
Tsutsumi relates to an aqueous ink for inkjet printing that contains at least one compound selected from the group consisting of compounds (a) to (d):

(a) an amino acid or salt thereof,

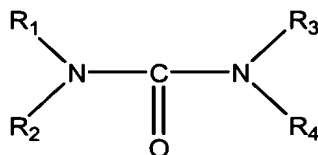
(b) a substantially water-soluble compound represented by formula (1)



(c) a substantially water-soluble compound represented by formula (2)

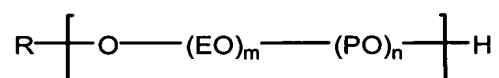


(d) a substantially water-soluble compound represented by formula (3)



Tsutsumi teaches that the amino compounds of (a) to (d) serve to impart moisture retention to the aqueous ink to secure ink dispersion stability and ejection properties. The inks of Tsutsumi also comprise a polymer emulsion. Tsutsumi teaches that the polymer emulsion can be an emulsion of fine polymer particles colored with a colorant. (Col. 3, lines 65-67). Tsutsumi teaches that the colorants to be used in the ink include dyes, such as oil-soluble dyes (oil colors), disperse dyes, direct dyes, acid dyes, and basic dyes, and pigments, all of which are commonly known to those of skill in the art.

Komatsu relates to an ink composition for printing on a heated recording medium. The ink compositions of Komatsu comprise a colorant, a water-soluble organic solvent, water, and at least one compound represented by the following formula (I):



The ink composition of Komatsu is formulated to print on a recording medium heated to a temperature of or above the cloud point of the compound of formula (I). The colorants of Komatsu can be a pigment directly included in the ink composition or a resin colored with dyes or pigments. Komatsu teaches a variety of organic and inorganic pigments and dyes, all of which are well-known to those of skill in the art.

Ohyama relates to quinophthalone compounds suitable for coloring liquid crystal materials. Ohyama discloses that the substituents on the 2H-indene-1,3-dione (R₃ and R₄) are selected from a very broad class of substituents including a vast number of specific substituents. The large number of very broad classes of substituents include

hydrogen, alkyl group, N-substituted aminocarbonyl group, a heterocyclic ring, or R_3 and R_4 collectively with the ring carbon atoms to which they are attached can form an N-substituted maleimide ring. Ohyama provides a list of preferred N-substituted aminocarbonyl groups, with the longest alkyl substituent on the amino being n-octyl. The only examples provided by Ohyama of R_3 being N-substituted aminocarbonyl groups with R_4 being hydrogen are $\text{CONHC}_4\text{H}_9(\text{n})$, $\text{CONHC}_6\text{H}_{13}(\text{n})$, $\text{CON}(\text{C}_3\text{H}_7(\text{n}))_2$, and $\text{CON}(\text{C}_4\text{H}_9(\text{n}))_2$. Ohyama discloses that the selected quinophthalone compounds have a high solubility in a liquid crystal material and the liquid crystal material can be colored and dyed at a high concentration and maintain a sharp and transparent color tone. (Col. 5, line 63 – Col. 6, line 1). Accordingly, the quinophthalone compounds of Ohyama are selected and developed as a coloring matter for liquid crystal materials. Applicants maintain that developing and selecting a coloring matter for liquid crystal materials is a significantly different technical field than developing and selecting a coloring matter suitable for an aqueous ink for ink jet recording. Applicants respectfully submit that Ohyama does not disclose or suggest applicability for aqueous ink for inkjet recording.

In contrast to the above-cited documents, the presently claimed invention relates to an aqueous ink for inkjet recording comprising water and a resin, wherein the resin is colored by a water-insoluble coloring matter selected from specifically claimed compounds. The specification also discloses that the claimed aqueous ink comprising resin colored by the water-insoluble coloring matter selected from the specifically claimed compounds has excellent storage stability, fixability to the recording medium, vividness of recorded image, light resistance, and water resistance. (page 55, 1st paragraph and Table 3).

The presently claimed aqueous inks comprise water and a resin as the main components, wherein the resin is colored with coloring matter selected from specifically claimed compounds. The coloring matter is selected from a specifically claimed class of c of formula (1), a specifically claimed class of pyridone azo compounds of formula (2), or mixtures thereof. In the quinophthalone compounds of formula (1), the 2H-indene-1,3-dione is substituted (at R_3) with a substituent CONR_4R_5 in which both R_4 and R_5 are a

linear alkyl group having **10 or more** carbon atoms or a **branched** alkyl group having **8 or more** carbon atoms.

It is respectfully submitted that the compounds of formula (1), with R_3 being $CONR_4R_5$ in which both R_4 and R_5 are a linear alkyl group having 10 or more carbon atoms or a branched alkyl group having 8 or more carbon atoms, exhibit excellent characteristics in comparison to those which have linear or branched alkyl groups of a shorter length than presently claimed.

To demonstrate this surprisingly superior characteristics of the presently claimed quinophthalone compounds, Applicants attach an Appendix containing a Table summarizing data from the specification. The coloring matters included in the Table in the Appendix are included in Table 1 of the specification as coloring matter No. 1, 28, 32, 33, and 34 (compounds having a branched alkyl group having 8 or more carbon atoms) and coloring matter No. 29 and 30 (compounds having a linear alkyl group having 10 or more carbon atoms). The results of evaluations of characteristics of these coloring matters are provided in Table 3 of the specification. Included in the Table is a comparison ink, ink C, wherein the quinophthalone compound is substituted with a substituent $CONR_4R_5$ wherein R_4 and R_5 are both a linear alkyl group having 8 carbon atoms (coloring matter 2). Also included in the Table are examples of quinophthalone compounds substituted with a substituent $CONR_4R_5$ wherein R_4 and R_5 are both a branched alkyl group having 8 carbon atoms, a linear alkyl group having 10 carbons, or a linear alkyl group having 12 carbons. The Table demonstrates that the presently claimed aqueous inks for inkjet recording, comprising a resin wherein the resin is colored with a quinophthalone of formula (1), with R_3 being $CONR_4R_5$ in which both R_4 and R_5 are a linear alkyl group having 10 or more carbon atoms or a branched alkyl group having 8 or more carbon atoms, exhibit excellent characteristics in comparison to those which have alkyl groups of a shorter length.

To establish a prima facie case of obviousness, three basic criteria must be met. First, there must be some suggestion or motivation, either in the references themselves or in the knowledge generally available to one of ordinary skill in the art, to combine the reference teachings. Second, there must be a reasonable expectation of success. Finally,

the prior art reference (or references when combined) must teach or suggest all the claim limitations. MPEP § 2143.

It is respectfully submitted that even if there were some suggestion or motivation to combine the reference teachings and a reasonable expectation of success, the cited references even when combined do not teach or suggest all the claim limitations.

The inks of Tsutsumi and Komatsu and the colorants for liquid crystal materials of Ohyama are significantly different than the presently claimed inks. The inks of Tsutsumi comprise a polymer emulsion and at least one of the amine compounds of (a) to (d) to impart moisture retention to the aqueous ink to secure ink dispersion stability and ejection properties. The polymer emulsion of Tsutsumi is an emulsion of fine polymer particles impregnated with water-insoluble or sparingly water-soluble well-known colorants. The inks of Komatsu comprise a water soluble organic solvent, water, a colorant, and an ethyleneoxy/propyleneoxy compound. The inks of Komatsu are specifically formulated to print on a recording medium heated to a temperature of or above the cloud point of the ethyleneoxy/propyleneoxy compound. The colorants of Komatsu can be any one of a long list of well-known pigments or a resin colored with well-known dyes or pigments. Ohyama discloses quinophthalone compounds, having high solubility in a liquid crystal material, wherein the substituents on the 2H-indene-1,3-dione ring of the quinophthalone compounds (i.e., R₃ and R₄) are selected from a large number of very broad classes of substituents, these classes including a vast number of specific substituents.

Accordingly, even if combined, it is respectfully submitted that neither Tsutsumi and Ohyama or Komatsu and Ohyama disclose or suggest the specifically claimed aqueous inks comprising water and a resin, wherein the resin is colored with coloring matter selected from a specifically claimed class of quinophthalone compounds of formula (1), a pyridone azo compounds of formula (2), or mixtures thereof, wherein in the quinophthalone compounds of formula (1), the 2H-indene-1,3-dione is substituted (R₃) with a substituent CONR₄R₅ in which both R₄ and R₅ are a linear alkyl group having 10 or more carbon atoms or a branched alkyl group having 8 or more carbon atoms. Applicants respectfully submit that, as summarized in the Table in the attached

Appendix, resin colored with the specifically claimed quinophthalone of formula (1), with R_3 being $CONR_4R_5$ in which both R_4 and R_5 are a linear alkyl group having 10 or more carbon atoms or a branched alkyl group having 8 or more carbon atoms, exhibit excellent characteristics in comparison to those which have alkyl groups of a shorter length.

Therefore, it is respectfully submitted that even if the cited art documents are combined, they do not teach or suggest all the claim limitations.

Moreover, Applicants maintain that the teachings of Tsutsumi and Komatsu do not suggest or provide any motivation to combine any feature of Tsutsumi or Komatsu with Ohyama. There is no teaching or suggestion in Ohyama of using the quinophthalone compounds in an aqueous inkjet ink composition. It is also respectfully submitted that Tsutsumi, which is related to amine compounds for imparting moisture retention to an aqueous ink to secure ink dispersion stability and ejection properties, does not suggest or provide any motivation to use quinophthalone compounds of Ohyama suitable for coloring liquid crystal materials. It is further respectfully submitted that Komatsu, which is related to an ink composition suitable for printing on a heated recording medium and thus containing certain ethyleneoxy/propyleneoxy compounds, does not suggest or provide any motivation to use quinophthalone compounds of Ohyama suitable for coloring liquid crystal materials.

Furthermore, Applicants respectfully submit that there is no a reasonable expectation of success in combining the inks of Tsutsumi or Komatsu with the quinophthalone compounds of Ohyama suitable for coloring liquid crystal materials. Applicants respectfully submit that the evaluation of properties of a coloring matter for use in liquid crystal materials would not be the same as the evaluation of properties of an aqueous ink for printing a colored image on paper. By way of example, it is respectfully submitted that evaluating the light-fastness of a coloring matter within a liquid crystal device would not be the same as evaluating light-fastness of a colored image printed on paper. Accordingly, it is respectfully submitted that there is no reasonable expectation of success in combining the inks of Tsutsumi or Komatsu with the quinophthalone compounds of Ohyama suitable for coloring liquid crystal materials.

Therefore, for at least the reasons noted above, Applicants respectfully request withdrawal of the obviousness rejections.

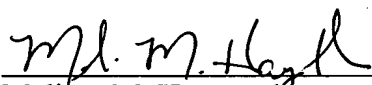
Conclusion

For at least the reasons noted above, the art of record does not disclose or suggest the inventive concept of the present invention as defined by the claims.

In view of the foregoing amendments and remarks, reconsideration of the claims and allowance of the subject application is earnestly solicited. The Examiner is invited to contact the undersigned at the below-listed telephone number, if it is believed that prosecution of this application may be assisted thereby.

Respectfully submitted,

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APPENDIX

Table

	EXAMPLE	COLORING NO.	PREPARATION PROCESS OF INK	EVALUATION OF CHARACTERISTICS								
				A	B	C	D	E	F-1 After 1 month	F-1 After 3 month	F-2 After 1 month	F-2 After 3 month
C	3	2	Example 1	○	⊙	○	⊙	⊙⊙	○	△	○	△
A-1	1	1	↑	⊙	⊙	⊙	⊙	⊙⊙	○	○	○	○
A-2	29	28	↑	⊙	⊙	⊙	⊙	⊙⊙	○	○	○	○
A-3	33	32	↑	⊙	⊙	○	⊙	⊙⊙	○	○	○	○
A-4	34	33	↑	⊙	⊙	⊙	⊙	⊙⊙	○	○	○	○
A-5	35	34	↑	⊙	⊙	○	⊙	⊙⊙	○	○	○	○
B-1	30	29	↑	⊙	⊙	⊙	⊙	⊙⊙	○	○	○	○
B-2	31	30	↑	⊙	⊙	⊙	⊙	⊙⊙	○	○	○	○

A: Branched alkyl group having 8 carbon atoms. : No. 1, 28, 32, 33 and 34.

B: Linear alkyl group having 10 carbon atoms: No. 29,

Linear alkyl group having 12 carbon atoms: No. 30,

C: Linear alkyl group having 8 carbon atoms: No. 2